

Application No. 10/599,018
Amdt. Dated: August 13, 2008
Reply to Office Action Dated: June 25, 2008

REMARKS/ARGUMENTS

The Examiner is thanked for the final Office Action mailed June 25, 2008. The status of the application is as follows:

- Claims 1-20 are pending;
- Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Graumann (US 2001/0036246A1);
- Claims 1-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Zheng et al. (US 2004/0111024A1);
- Claims 1-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Mitschke et al. (US 2003/0179856A1); and
- Claims 1-2 and 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suhm (US 6,491,429 B1) in view of Graumann.

The rejections are discussed below.

The Rejection of Claims 1-20 under 35 U.S.C. 102(b)

Claims 1-20 stand rejected under 35 U.S.C. 102(b) as being anticipated by Graumann. This rejection should be withdrawn because Graumann does not teach each and every element as set forth in the subject claims and, therefore, does not anticipate claims 1-20.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). MPEP §2131.

Independent claims 1 and 15 are directed to an x-ray examination apparatus for acquiring x-ray image data of a region of interest. Claims 1 and 15 require, *inter alia*, a processing device for determining a desired position of the imaging unit, at which x-ray data shall be acquired, based on a predetermined image acquisition plan. The Office asserts that Graumann teaches these claim aspects in ¶ [0034]. Applicant respectfully disagrees.

Graumann discloses that images from a camera system are used by a computer 26 to determine the current respective positions of the x-ray source 2, the x-ray detector 4, an element 15 of the patient's chair, and an instrument 27 (see ¶ [0034]). Data about the current positions of x-ray source 2, x-ray detector 4, element 15, and instrument 27 are provided by computer 26 to an image computer 17. With this data, the image computer 17 can create a relationship between an x-ray coordinate system K1 and a reference coordinate system KR and can determine the coordinates of a 3D image dataset with respect to the reference coordinate system KR. Given a modification of the position of the patient head, it is possible to adjust the 3D dataset to the new position of the head and to correspondingly adapt the image representation at a display 18. Neither the computer 26 nor the image computer 17 determine a desired position of the imaging unit, at which x-ray data is acquired, based on a predetermined image acquisition plan as is required by claims 1 and 15. Accordingly, this rejection should be withdrawn.

Independent claim 9 is directed to a method using the x-ray examination apparatus of claim 1. As such, the above discussion with respect to claim 1 applies *mutatis mutandis* to claim 9, and this rejection should be withdrawn.

Claims 2-8, 10-14 and 16-20 depend respectively from claims 1, 9 and 15 and are allowable at least by virtue of their dependencies.

The Rejection of Claims 1-20 under 35 U.S.C. 102(e)

Claims 1-20 stand rejected under 35 U.S.C. 102(e) as being anticipated by Zheng et al. This rejection should be withdrawn because Zheng et al. does not teach each and every element as set forth in the subject claims and, therefore, does not anticipate claims 1-20.

Independent claims 1 and 15 are directed to an x-ray examination apparatus for acquiring x-ray image data of a region of interest. Claims 1 and 15 require, *inter alia*, a processing device for determining a desired position of the imaging unit, at which x-ray data shall be acquired, based on a predetermined image acquisition plan and an actual position of an instrument. The Office asserts that Zheng et al. teaches these claims aspects in ¶ [0042]. Applicant respectfully disagrees.

Zheng et al. discloses positioning an imaging device 6 in different positions with respect to a bone 21, which allows a region of interest of the bone 21 to be mapped from different angles

of view on the plane of projection 7 of the imaging device 6 (see ¶ [0042]). First and second images 11, 13 are obtained and may be saved as first and second data sets of data to a storage medium 9 of a computer 10. However, the computer 10 does not determine a desired position of the imaging device 6 at which x-ray data is acquired based on a predetermined image acquisition plan as is required by claims 1 and 15. Accordingly, this rejection should be withdrawn.

Independent claim 9 is directed to a method using the x-ray examination apparatus of claim 1. As such, the above discussion with respect to claim 1 applies *mutatis mutandis* to claim 9, and this rejection should be withdrawn.

Claims 2-8, 10-14 and 16-20 depend respectively from claims 1, 9 and 15 and are allowable at least by virtue of their dependencies.

The Rejection of Claims 1-20 under 35 U.S.C. 102(e)

Claims 1-20 stand rejected under 35 U.S.C. 102(e) as being anticipated by Mitschke et al. This rejection should be withdrawn because Mitschke et al. does not teach each and every element as set forth in the subject claims and, therefore, does not anticipate claims 1-20.

Independent claims 1 and 9 are directed to an x-ray examination apparatus and method for acquiring x-ray image data of a region of interest. Claims 1 and 9 require, *inter alia*, a processing device for determining a desired position of the imaging unit, at which x-ray data shall be acquired, based on a predetermined image acquisition plan. The Office asserts that Mitschke et al. teaches these claim aspects. Applicant respectfully disagrees.

Mitschke et al. discloses an apparatus including a C-arm X-ray device 3 provided with an X-ray source 13 and an X-ray receiver 14 (see ¶ [0016]). A volume dataset of a body region of a patient P is acquired with the C-arm X-ray device 3 (see ¶ [0017]). 2D or 3D X-ray images of the acquired body region of the patient P can be generated from the volume dataset and displayed on a viewing device 5. The apparatus also includes a navigation system 20 including a computer 23 and cameras 21, 22 for supporting a navigation guided intervention at the patient P (see ¶ [0018]). An apparatus 1 is secured to the patient P that has a rod 30 that is secured to the humerus of the patient P. The rod 30 includes X-ray transparent markers 31 and 33 that can be detected by the navigation system 20. When a volume dataset of the region around the humerus of the patient P is acquired, the X-ray positive marks 31 are likewise contained in the volume

dataset as images, by virtue of communication between the computer 23 and an image computer 9 of the C-arm X-ray device 3, and can be imaged in the 2D or 3D X-ray image 4 generated from the volume dataset by the image computer 9 (see ¶ [0019]). Neither of the image computer 9 nor the computer 23 determine a desired position of the imaging unit, at which X-ray image data is acquired, based on a predetermined image acquisition plan as is required by claims 1 and 9. Accordingly, these rejections should be withdrawn.

Independent claim 15 is directed to an x-ray examination apparatus containing claim aspects similar to claim 1 and includes the claimed aspect of a processing device for determining a desired position of the imaging unit, at which x-ray data shall be acquired, based on a predetermined image acquisition plan. As such, the above discussion with respect to claims 1 and 9 applies *mutatis mutandis* to claim 15, and this rejection should be withdrawn.

Claims 2-8, 10-14 and 16-20 depend respectively from claims 1, 9 and 15 and are allowable at least by virtue of their dependencies.

The Rejection of Claims 1-2 and 4-9 under 35 U.S.C. 103(a)

Claims 1-2 and 4-9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Suhm in view of Graumann. This rejection should be withdrawn because the combination of Suhm and Graumann et al. does not teach or suggest all of the limitations of the subject claims and, therefore, fails to establish a *prima facie* case of obviousness with respect to the subject claims.

To establish *prima facie* obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, (CCPA 1974). MPEP §2143.03.

Independent claims 1 and 9 are directed to an x-ray examination apparatus and method for acquiring x-ray image data of a region of interest. Claims 1 and 9 require, *inter alia*, a processing device for determining a desired position of the imaging unit, at which x-ray data shall be acquired, based on a predetermined image acquisition plan and an actual position of an instrument. The Office asserts that Suhm teaches these claim aspects. Applicant respectfully disagrees.

Suhm discloses a method directed to automatically guiding a C-arm X-ray device 1 which includes a position measurement device 7 and a computer 9 (see col. 5, lines 34-67 to col.

6, lines 1-35). The method includes fixing a reference element 3 at a bone 4 to be surgically treated. The C-arm X-ray device 1 is positioned with a desired plane of projection 2 at the bone 4 to be surgically treated. The position and orientation of the plane of projection 2 to the position and orientation of the first reference element 3 is referenced by means of the computer 9 whereby a mathematical relationship between the plane of projection 2 and the first reference element 3 is established and stored in a data storage means of the computer 9. The bone 4 is surgically treated with interoperative and continuous use of the C-arm X-ray device 1 or with intraoperative discontinuous use of the C-arm X-ray device 1. The position and orientation of the first reference element 3 displaced with the bone 4 is measured by means of the position measurement device and the computer 9. The deviation between the actual position and orientation of the first reference element 3 and the original position and orientation of the first reference element 3 is determined with computer 9. The new position of the C-arm X-ray device is determined in order to reset the plane of projection with computer 9. The C-arm X-ray device is guided into the new position and adjustment of the plane of projection 2 with an automatic controlling means directing the motorized exact positioning unit that displaces the C-arm into the desired position.

Hence, Suhm teaches using a position measurement device 7 to measure the relative positions of the first reference element 3 attached at the bone 4 and the C-arm X-ray device 1 to position the C-arm X-ray device 1 with the automatic controlling means during or after surgical treatment of the bone 4. However, the automatic controlling means does not determine a desired position of the imaging unit based on a predetermined image acquisition plan and an actual position of an instrument as is required by claims 1 and 9. Accordingly, these rejections should be withdrawn.

Claim 2 and 4-8 depend respectively from claims 1 and are allowable at least by virtue of their dependencies.

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Conclusion

In view of the foregoing, it is submitted that the claims distinguish patentably and non-obviously over the prior art of record. An early indication of allowability is earnestly solicited.

Respectfully submitted,

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